REMARKS

The October 31, 2005 non-final office action has been reviewed and its content carefully noted. Favorable reconsideration of this case is respectfully requested. Claims 16-32 are pending in this application and are currently rejected.

Applicants have amended claims 16 and 32 to further clarify that an energy centre forms in the region of the lower end of the charging tube to provide a surplus amount of energy for melting the metal-containing material. Claim 31 was corrected to read "forming water vapor" instead of "foaming water vapor." Support for the claim amendments may be found *inter alia* in the specification on page 6, lines 22-27 and page 9, lines 36-39. Reconsideration of the application is respectfully requested.

Claim Rejections – 35 U.S.C. §112

The Examiner has rejected claim 31 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner has stated that if what was intended was "forming water vapor," then additional information is required regarding the cooling process.

Applicants have amended claim 31 to read "forming water vapor" instead of "foaming water vapor." Applicants submit that the process of forming water vapor in a furnace where water is introduced for the purposes of cooling is well known to those persons having ordinary skill in the art. *See* Exhibit A, U.S. Patent No. 5,426,664 to Grove directed to Water Cooled Copper Panel for a Furnace and Method of Manufacturing Same.

Claim Rejections – 35 U.S.C. §103

A. U.S. Patent 6,524,362 to Eichberger et al. in view of U.S. Patent 5,573,573 to Berger et al.

The Examiner has rejected claims 16-25, 28, 29, 31 and 32 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No.: 6,524,362 to Eichberger et al. ("Eichberger") in view of U.S. Patent No.: 5,573,573 to Berger et al. ("Berger").

Applicants respectfully traverse the Examiner's rejection as being improper in view of MPEP §2143 providing:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Applicants respectfully submit that a *prima facie* case of obviousness has not been set forth because the office action fails to show how the cited combination teaches or suggests all the limitations of claims 16 and 32. Eichberger teaches a process of melting fine grained, direct reduced iron (DRI) in an electric arc furnace where during the operation of the furnace, DRI is fed through at least one lance. (Col. 1, lines 6-14). The electric arc furnace has an upper electrode and hollow lances protruding from the top of the furnace into its interior. (Col. 2, lines 54-60, Fig. 1). Upper electrode 5 is shown surrounded by lances 6 in the center of the furnace. (*See* Figs. 1, 2, 3 and 4). Berger teaches melting scrap metal using an electric arc furnace. (Col. 1, lines 9-10). The melting of the metal is accomplished by graphite electrodes projecting laterally into a lower part of the furnace vessel from aside, i.e., the vessel periphery. (Col. 2, lines, 13-14, Col. 9, lines 53-58; *See* Figs. 1a and 3). The graphite electrodes are oriented obliquely downwards to the bottom of the furnace vessel. (Col. 3, lines 8-10).

However, combining the teachings of Eichberger and Berger as proposed by the Examiner would require moving the electrodes to the periphery of the furnace and minimizing the concentration of heat at the point where material is fed through the lances. There is no teaching or suggestion in the references to arrive at the presently claimed invention where the electric arcs are directed obliquely against the central region of the furnace. Applicants point out that because the electric arcs are directed obliquely against the central region of the furnace, the process of melting down the metal-containing material is accelerated. An energy center forms in the region of the charging tube outlet minimizing the loss of particulate through the hot off-gases. Both Eichberger and Berger are silent on forming an energy centre in the region of the lower end of the charging tube to provide a surplus amount of energy for melting the metal-containing material. There is no teaching or suggestion in Eichberger or Berger to arrive at what is presently claimed. Therefore, the rejection is improper and should be withdrawn.

Moreover, even if there was there was some teaching or suggestion to arrive at the presently claimed invention, there would be no reasonable expectation of success. Claims 16 and 32 require directing electric arcs obliquely toward the metal melt against the central region of the furnace forming an energy centre in the region of the lower end of the charging tube. The energy centre provides a surplus amount of energy to increase the rate of melting the metal-containing material. This makes it possible to melt metal-containing material having a portion of fine particles of up to 100% in large amounts without a discharge of the particles occurring due to gas flow conditions.

To the contrary, the Examiner's proposed combination would make achieving this end result impossible due to the distance between electrodes. The electrodes would be located about the periphery of the furnace following the above-cited combination. The energy would not be

centered at the spot where the solids are introduced, which would make a quick melting of the conveying material impossible. Therefore, because there would be no reasonable expectation of success from the proposed combination, the Examiner's rejection is improper and should be withdrawn.

B. Eichberger in view of Berger and further in view of U.S. Patent 5,641,336 to Roth

The Examiner has rejected claim 30 under 35 U.S.C. §103(a) as being unpatentable over Eichberger in view of Berger and further in view of U.S. Patent No.: 5,641,336 to Roth ("Roth").

Applicants respectfully traverse the Examiner's rejection. As discussed *supra*, a *prima facie* case of obviousness has not been set forth because the office action fails to show how the cited the combination of Eichberger and Berger teaches or suggests all the limitations of claims 16 and 32. Roth fails to cure this deficiency. Roth is directed to a furnace for melting metal-bearing substances having a side wall with an orifice opening for removing slag when foaming is excessive. Roth does not teach or suggest electric arcs directed obliquely against the central region of the furnace thereby forming an energy centre in the region of the lower end of the charging tube to provide a surplus amount of energy for melting the metal-containing material. As such, the Examiner's rejection is improper and should be withdrawn.

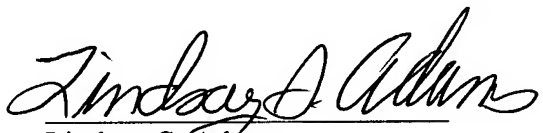
C. Eichberger in view of Berger and further in view of U.S. Patent 5,827,474 to Usher et al.

The Examiner has rejected claims 26 and 27 under 35 U.S.C. §103(a) as being unpatentable over Eichberger in view of Berger and further in view of U.S. Patent No.: 5,827,474 to Usher ("Usher").

Applicants respectfully traverse the Examiner's rejection. Usher also fails to cure the deficiency of Eichberger and Berger. Usher is directed to an apparatus and method for measuring the depth of slag and molten metal contained in a vessel. Usher fails to teach or suggest electric arcs directed obliquely against the central region of the furnace thereby forming an energy centre in the region of the lower end of the charging tube to provide a surplus amount of energy for melting the metal-containing material. As such, this rejection is also improper and should be withdrawn.

Applicants respectfully submit that this application is in condition for allowance. Early and favorable action is earnestly solicited. If any additional fee is due, the amount of such fee may be charged to Deposit Account No. 50-1145.

Respectfully submitted,



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